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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

HO, TU TU V

ART UNIT PAPER NUMBER

2818

DATE MAILED: 05/03/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/653,541

Applicant(s)

TUTTLE, MARK

Examiner

Tu-Tu Ho

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-96 is/are pending in the application.
- 4a) Of the above claim(s) 41-63 and 87-96 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-40 and 64-86 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 October 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other:

DETAILED ACTION

Election/ Restriction

1. Applicant's election of Group I claims 1-69 in Paper No. 6 filed 27 November 2002 and subsequent election of Species I (claims 1-40 and 64-69) in Paper No. 8 filed 12 March 2002 are acknowledged. However, upon careful examinations of the claims, the examiner has found that Species I should also include method claims 70-86, which are different from device claims 1-31 only in method claim language used rather than specific procedures or materials. Therefore, claims 1-40, 64-69, and 70-86 are examined in this Office Action.

Drawings

2. Figures 1 and 2 should be designated by a legend such as – Prior Art –, or – Background Art –, or – Related Art – in order to clarify what is applicants' invention. (See MPEP § 608.02(g)).

Correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. §102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

4. Claims 1-2, 32, and 70 are rejected under 35 U.S.C. §102(e) as being anticipated by Wang et al. U.S. Patent 5,977,626.

Regarding claims 1,2, and 70, Wang et al. disclose in Figure 2 and respective portions of the specification an integrated circuit structure comprising:

at least one integrated circuit chip 22 containing structures which may be affected by external magnetic fields, said integrated circuit chip having a front surface and a back surface, said front surface being supported by a chip carrier 20; and

a magnetic field shielding material 32 (heat spreader) in contact with said back surface of said chip (see column 4, lines 28-31 for a statement that the heat spreader improves EM shielding effect).

It is evident that the structure also discloses a method as claimed in claim 70.

Referring to claim 32, Wang et al. disclose in Figure 2 and respective portions of the specification an integrated circuit chip 22 containing structures which may be affected by external magnetic fields, said chip comprising a magnetic field shielding material 32 in contact with a surface of said chip.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-2, 9-12, 19-22, 32, 39-40, 64-65, 70-74, and 76-78 are rejected under 35 U.S.C. §103(a) as being unpatentable over prior art (figures 1 and 2 of the present application) in view of Wang et al. U.S. Patent 5,977,626 (patent '626) or Cassarly et al. U.S. Patent 4,433,886 (patent '886) and further in view of Higuchi et al. U.S. Patent 4,835,598 (patent '598).

Referring to claims 1-2, 9-12, 19-20, 32, 39-40, 64, 70-71, and 77-78, a conventional flip-chip device as disclosed in Figures 1 and 2 of the application comprises:

a die/semiconductor chip 30 electrically connected to a die/semiconductor chip carrier 20, said die/semiconductor chip further comprising a magnetic random access memory device; and
a printed circuit board (not shown but could be coupled to said die carrier) electrically connected to said die carrier.

However, in the conventional flip-chip structure, the die is not in contact with a first layer of magnetic field shielding material and the printed circuit board is not in contact with a second layer of magnetic field shielding material.

Nevertheless, as mentioned above for claim 1, patent '626 discloses in figure 2 a heat spreader 32, which is in contact with semiconductor chip 22 to shield the chip from EM

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radiation. For the same reason, patent '886 discloses in figure 1 a chip package 8 wherein the semiconductor chip (no number) is in contact with heat sink 14. And, patent '598 discloses in figures 1-4 and respective portions of the specification a wiring board/chip carrier package wherein printed circuit board 1 includes metal foil 6, adhesive 5, insulating substrate 2, adhesive 5, and metal foil 6 for heat releasing and magnetic shielding (column 2, lines 3-7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings disclosed by patent '626 or patent '886 and patent '598 into the conventional flip-chip device. One would have been motivated to make such a modification in view of the suggestion in patent '626 or patent '886 that a metal layer in contact with a die/semiconductor chip could protect the die/chip from external electromagnetic radiation and in view of patent '598 that one or two layers of metal foil interlaminated with adhesive and insulating layers could also shield the die/chip from stray electromagnetic radiation. Thus the device is hereinafter called the proposed '886/598 flip-chip structure.

With respect to claims 21 and 22 and claims 72-74 and 76, the proposed '886/598 flip-chip structure as described above for claim 20 and the method for claim 71, wherein said die carrier/printed circuit board comprises a layer of magnetic field shielding material on an upper surface of said printed circuit board and a layer of magnetic field shielding material on a bottom surface of said printed circuit board (see figure 1, patent '598).

With respect to claim 65, the proposed '886/598 flip-chip structure as described above for claim 64, wherein said die carrier/wiring board comprises a third layer of magnetic field shielding material.

7. Claims 3-8, 13-18, 23-31, 33-38, 66-69, 75, 79-80, and 82-86 are rejected under 35 U.S.C. §103(a) as being unpatentable over prior art (figures 1 and 2 of the present application) in view of Wang et al. U.S. Patent 5,977,626 (patent '626) or Cassarly et al. U.S. Patent 4,433,886 (patent '886) and further in view of Higuchi et al. U.S. Patent 4,835,598 (patent '598), as applied above, and further in view of Kubo U.S. Patent 5,307,100.

Referring to claims 3-8, 13-14, 24, 33-34, 66-67, 79-80, and 83-84, the proposed '886/598 flip-chip structure as described above for claims 1, 12, 20, 32, 65, 70, and 71 fails to teach that shielding material comprises a magnetic material selected from the group consisting of ferrites and Metal/Ferrite/Oxide. Instead, the combined teachings disclose copper or aluminum. On the other hand, Kubo shows in figure 7 an electromagnetic shield plate 55 made of copper, aluminum, ferrite, or the like (column 6, lines 50-55), thereby teaching that copper and aluminum server as magnetic shielding materials just as ferrite. Furthermore, it would have been an obvious design choice to use a metal/ferrite/oxide material as a magnetic shielding material.

With respect to claims 15-18, 23, 25-31, 35-38, 68-69, 75, 81-82, and 85-86, in order to provide a suitable intended use and end means in the claimed integrated circuit structure and method, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select known available materials and technologically feasible sizes, shapes, and designs as recited in these claims.

Conclusion


8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. Sudoh et al. U.S. Patent 5,352,925 disclose a semiconductor carrier/enclosure with electromagnetic shield.
- b. Hertz et al. U.S. Patent 5,418,688 disclose an electronic device having stacked printed circuit boards.
- c. Nishihara et al. U.S. Patent 5,639,990 disclose a solid printed substrate/chip carrier.
- d. Larson et al. U.S. Patent 6,109,530 disclose an integrated circuit carrier package with battery coin cell having electromagnetic shielding property.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tu-Tu Ho whose telephone number is (703) 305-0086. The examiner can normally be reached on 6:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID NELMS can be reached on (703) 308-4910. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.


Tu-Tu Ho
April 27, 2002


HOAI HO
PRIMARY EXAMINER